

## CLAIMS

1. A gene fragment coding for a VH chain or a portion thereof of a human anti-human Monocyte chemoattractant protein-1 (hereinafter referred to as "human MCP-1") antibody that binds to human MCP-1 and inhibits the biological activity thereof.
2. The gene fragment of claim 1 wherein complementarity determining regions (CDR1 to CDR3) of said VH chain have the following amino acid sequences:
- 10 CDR1: Ser Tyr Ala Ile Ser (SEQ ID NO: 3)  
CDR2: Gly Phe Asp Pro Glu Asp Gly Glu Thr Ile Tyr Ala Gln  
Lys Phe Gln Gly (SEQ ID NO: 4)  
CDR3: Asp Leu Gly Gly Gly Asp Tyr Tyr Tyr Gly Met Asp Val  
(SEQ ID NO: 5).
- 15 3. The gene fragment of claim 1 or 2 wherein said VH chain has the amino acid sequence depicted in SEQ ID NO: 2 or the amino acid sequence depicted in SEQ ID NO: 2 in which one or several amino acids are deleted, substituted or added.
- 20 4. The gene fragment of claim 3 wherein said VH chain has the amino acid sequence depicted in SEQ ID NO: 2.
5. A gene fragment coding for a VL chain or a portion thereof of a human MCP-1 antibody that binds to human MCP-1 and inhibits the biological activity thereof.
- 25 6. The gene fragment of claim 5 wherein

complementarity determining regions (CDR1 to CDR3) of said VL chain have the following amino acid sequences:

CDR1: Arg Ser Ser Gln Ser Ile Asn Thr Tyr Leu His (SEQ ID NO: 8)

5 CDR2: Ala Ala Ser Thr Leu Gln Ser (SEQ ID NO: 9)

CDR3: Gln Gln Ser Phe Thr Thr Pro Leu Thr (SEQ ID NO: 10).

7. The gene fragment of claim 5 or 6 wherein said VL chain has the amino acid sequence depicted in SEQ ID NO: 7 or the amino acid sequence depicted in SEQ ID NO: 7 in  
10 which one or several amino acids are deleted, substituted or added.

8. The gene fragment of claim 7 wherein said VL chain has the amino acid sequence depicted in SEQ ID NO: 7.

9. A gene fragment coding for a single chain Fv  
15 (hereinafter referred to as "scFv") of a human anti-human MCP-1 antibody that binds to human MCP-1 and inhibits the biological activity thereof, said gene fragment consisting of the gene fragment coding for the VH chain of any one of claims 1 to 4 combined with the gene fragment coding for  
20 the VL chain of any one of claims 5 to 8.

10. A gene fragment coding for a human anti-human MCP-1 antibody that binds to human MCP-1 and inhibits the biological activity thereof, said gene fragment consisting of the gene fragment coding for the VH chain of any one of  
25 claims 1 to 4 combined with a human antibody CH chain gene

and the gene fragment coding for the VL chain of any one of claims 5 to 8 combined with a human antibody CL chain gene.

11. A gene fragment coding for a human anti-human MCP-1 antibody fragment that binds to human MCP-1 and inhibits the biological activity thereof, said gene fragment consisting of the gene fragment coding for the VH chain of any one of claims 1 to 4 combined with a portion of a human antibody CH chain gene and the gene fragment coding for the VL chain of any one of claims 5 to 8 combined with a portion of a human antibody CL chain gene.

12. The gene fragment of claim 11 wherein said antibody fragment is selected from Fab, Fab' or F(ab')<sub>2</sub>.

13. A gene fragment coding for a human anti-human MCP-1 antibody fragment that binds to human MCP-1 and inhibits the biological activity thereof, said gene fragment consisting of the scFv gene fragment of claim 9 combined with either a portion of a human antibody CH chain gene or with a portion of a human antibody CL chain gene.

14. A human anti-human MCP-1 antibody that binds to human MCP-1 and inhibits the biological activity thereof or a fragment of said antibody, which is expressed by the genetic recombination technique from an expression vector in which the gene fragment of any one of claims 1 to 13 is incorporated.

15. A modified protein molecule consisting of the

human anti-human MCP-1 antibody or a fragment of said antibody to which a high molecular weight modifying agent is bound.

16. An agent for inhibiting the activity of human  
5 MCP-1 comprising as an active ingredient the human anti-human MCP-1 antibody or a fragment of said antibody of claim 14 or the modified protein molecule of claim 15.

17. A medicament for preventing or treating  
inflammation and immunopathy caused by human MCP-1, said  
10 medicament utilizing the agent for inhibiting the activity of human MCP-1 of claim 16.